Animal Adaptations

Grade 3

Enduring Understanding

Many different types of plants and animals live in the same habitat and have specific physical features that enable it to survive in its habitat.

Essential Questions

How would you describe major water-ecosystems?
How would you describe major dry land-ecosystems?
How can plants and animals survive in their habitats?

Objectives

1. Concept Objective: Understand that ecosystems support a diversity of plants and animals and that animal's physical features aid in their survival in a specific habitat.

2. Lesson Content: Plants and animals live within their water and/or dry-land ecosystem

3. Skill Objective(s)
a. Describe major water-related ecosystems and provide some examples of animals and plants that live in each.
b. Describe major dry-land ecosystems and examples of some animals and plants that live in each.
c. Compare and contrast water-related and dry-land ecosystems.
d. Create a graph to organize data gathered on types of plants and animals found in an ecosystem.
e. Describe examples of physical adaptations that enable animals to survive in their habitat
d. Design an animal with physical features that enable it to survive in a specific habitat
f. Explain and defend the selection of specific physical features in a made-up animal

Time Required

3-4 daily lessons: 1-2 in class, 1 on a trip to the Kenilworth Aquatic Gardens, 1 after the trip

Materials

Books about different ecosystems, for example: *Life in the Oceans* by Lucy Baker, *Crabby's Water Wish - A Tale of Saving Sea Life* by Suzanne Tate, *Swamp Life* A Dorling Kindersley Book, *The Great Kapok Tree* by Lynne Cherry, *The Water Hole* by Graeme Base, *Rain, Rain, Rain Forest* by Brenda Guiberson, *Way Out In The Desert* by T.J.Marsh.

Posters or photographs of different types of ecosystems

Large chart paper

If possible, cameras (or clip boards, paper and pencils) for the field trip

Sticky notes

Blank white paper

Color pencils, crayons, or markers

Visit website: www.exploringnature.org

Key Vocabulary

An **ecosystem** is many communities of plants and animals and their environment.
A **habitat** is the natural place where a plant or animal lives and grows.
Diversity is many different kinds of things in a group.

Background

- Water -related ecosystems include those with fresh water or salt water. Examples include ponds, marshes, swamps, streams, rivers, and oceans.
- Dry-land ecosystems include deserts, grasslands, rain forests, and forests.
- There are distinct differences among pond, marshland, swamp, stream, river, ocean, desert, grassland, rainforest, and forest ecosystems.
- A population is a group of organisms of the same kind that lives in the same place. Examples of a population are a flock of swans in a pond, a school of fish in a river, and a herd of cattle in the grassland.
- A community is all of the populations that live together in the same place. An example of a dry-land community would be a forest made up of trees, squirrels, worms, rabbits, and hawks. An example of a water-related community would be an ocean made up of fish, crabs, and seaweed.
- At the Kenilworth Aquatic Gardens it is easy to see and explore distinct pond, marsh, river, and forest habitats.

Procedures/Activities

Prior to the field trip to the Kenilworth Aquatic Gardens:

1. Begin a discussion with the students about the different places where animals and plants make their homes. Guide the discussion to ecosystems such as forests, deserts, etc. As students offer their ideas, begin recording a list of those places. Using a globe, ask students if they think there are other places in the world where plant and animals make their homes, lead the discussion to the different types of water ecosystems, such as oceans, lakes, ponds, etc.

2. Introduce the definition of the word ecosystem and discuss how ecosystems can be divided into water and land ecosystems. Have the class sort the different ecosystem names recorded in the class generated list into two groups, under the headings water and land ecosystems.

3. Using books, either some of the suggested books for this lesson, or books available to you in your classroom or school library, students will begin to explore different types of plants and animals that they see living in different types of ecosystems. Split the class into groups of 3 -4 students. Have each group read a book (or several books) with examples of the types of plants and animals that live in a specific ecosystem (ie - one group reads about deserts, one group about rainforests, etc). As students read/look at the pictures of the books, they will keep track of different types of animals and plant life that lives in their particular ecosystem. * *The standard does not focus on the specific names of plants and animals living in different habitat, rather it focuses on the diversity present in those habitats.* Students should mark/tag the pages that show specific animals or plants with sticky notes and write the name of the particular plant or animal on that sticky note.

4. Have each group present to the whole class their findings of the different types of plants and animals they found living in their specific ecosystem. As they present to the class, they should remove their sticky notes and place them on chart paper in front of the class under a heading with the name of their ecosystem.

5. After everyone presents, lead a discussion to the big idea of how diverse life is in each ecosystem. Discuss how some ecosystems have several habitats in them (ie - a forest can have land animals that live in trees and water animals that live in rivers, and animals that use both).

6. Ask students how they could organize this information in a way that would be easier to understand. Discuss how graphing information could help them to visually represent the idea that there are a lot of different ways to organize information. This lesson can lead into a math lesson where you review different types of graphs (pictographs, bar graphs, pie graphs) and use the information about what students to learn to ask and answer questions about the data collected.

7. (Day 2) Choose several specific animals that have physical features that allow them to survive in their habitats well. Choose an animal that lives in of the different habitats that the students will come into contact with on their trip to the Kenilworth Aquatic Gardens such as a turtle, frog, dragonfly, large birds such as ducks, geese, great blue heron or the white egret, muskrat, beaver or deer.

8. Discuss several specific physical features that allow animals to survive in their habitats such as a turtle's shell protecting it from prey, duck's waterproof feathers that make water roll off and allow it to keep insulated, or the beaver's webbed back feet that help it to swim or its sharp incisors that allow it to cut through wood. A good resource for information on these animals can be found at: www.exploringnature.org

During the field trip to the Kenilworth Aquatic Gardens:

1. Come to the Gardens for a tour of the ponds, wetlands and/or forest. As students go on their tour, stop in several locations to discuss what type of habitat the students think they are in and justify their answer by explaining how they know. Give the students time to point out the different types of plants they see, animals they may find and sources of water that exist.

2. In each habitat, look for signs of animal life. If possible, have students identify animal life that they see or animals that they believe could survive in this type of habitat and how they know (ie- what types of food sources are available, what types of shelter is available).

3. Depending on the resources available to you, on your trip have the students either take photographs of the things they see on their trip, or stop to take notes/sketch the different types of plants/animals that they discover on their trip. These images/notes will provide a platform for discussion of animal adaptations once they have returned to the classroom.

After the trip to the Kenilworth Aquatic Gardens:

1. It's time to do some designing! Review the types of plant and animal life that you were able to see or imagine living in the habitats you explored on your field trip. Return to the animals that you discussed prior to the trip and discuss which habitat you think they could live in or where you saw them. Using the photographs, or notes/sketches created on the trip, review different types of habitats and animals discussed/identified on the trip. Discuss the types of physical adaptations each animal has to help it survive.

2. Students will now design their OWN made-up animal that could survive in a habitat of their choosing. Since you have focused on habitats at the Aquatic Gardens, you may require students to stick to one of those habitats, or let them branch out if you have studied additional ecosystems.

3. Pass out a blank sheet of white paper and have students fold their paper into 8 equal parts. In each section, they should label one of the following: Tail, Feet, Mouth, Eyes, Ears, Body, Legs, Nose. Students will draw a body part in each box for their made-up animal that could survive in their chosen habitat. Be sure that students are able to defend why they choose that particular body part.

4. On a new clean white page, students should draw a large image of their made-up animal, including all of the physical adaptations they created on their folded paper. Give them time to add details and color that may be relevant to its survival in its habitat.

5. Students should share their created animal to the class, explaining each feature they selected and have their classmates guess which habitat the animal would call its home. The presenter should then correctly explain which habitat it would live in and how all those features would help their animal survive.

Assessment

Student diagrams of their made-up animal created after the field trip. Oral presentation given to the class to explain/defend which habitat their animal could survive in based on their selected physical features.

Links to Next Generation Science Standards

3-LS4 Biological Evolution: Unity and Diversity

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Students who demonstrate understanding can:

3-LS4-1. **Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.** [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-2. **Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.** [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

3-LS4-3. **Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.** [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

3-LS4-4. **Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*** [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence. (3-LS4-3)
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)

Disciplinary Core Ideas

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. *(secondary to 3-LS4-4)*

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. *(Note: moved from K-2)* (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

LS4.D: Biodiversity and Humans

- Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2),(3-LS4-3)

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

Systems and System Models

- A system can be described in terms of its components and their interactions. (3-LS4-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (3-LS4-1)

Connections to other DCIs in third grade: **3.LS4.C** (3-LS4-2); **3.ESS2.D** (3-LS4-3); **3.ESS3.B** (3-LS4-4)

Articulation of DCIs across grade-levels: **K.ESS3.A** (3-LS4-3)(3-LS4-4); **K.ETS1.A** (3-LS4-4); **1.LS3.A** (3-LS4-2); **2.LS2.A** (3-LS4-3),(3-LS4-4); **2.LS4.D** (3-LS4-3),(3-LS4-4); **4.ESS1.C** (3-LS4-1); **4.ESS3.B** (3-LS4-4); **4.ETS1.A** (3-LS4-4); **MS.LS2.A** (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4); **MS.LS2.C** (3-LS4-4); **MS.LS3.B** (3-LS4-2); **MS.LS4.A** (3-LS4-1); **MS.LS4.B** (3-LS4-2),(3-LS4-3); **MS.LS4.C** (3-LS4-3),(3-LS4-4); **MS.ESS1.C** (3-LS4-1),(3-LS4-3),(3-LS4-4); **MS.ESS2.B** (3-LS4-1); **MS.ESS3.C** (3-LS4-4)

Common Core State Standards Connections:

ELA/Literacy –